Teaching with Technology

Exploring mathematics in the real-world with Skitch

Maree A. Skillen
University of Western Sydney
<m.skillen@uws.edu.au>

Maree Skillen provides a practical guide to using the free, Skitch app to promote mathematical exploration and understanding. Five activities are provided, with links made to the Australian Curriculum: Mathematics.

"Technology gives kids power that people their age have never had. Let's help them use it wisely." (Prensky, 2013)

Introduction

Students are very different now from those of only a few years ago in terms of their experiences with and expectations of technology. This is a digital generation: one that has no memory of life without a multitude of technology tools (Jonassen, Howland, Marra & Crismond, 2008). Such tools include iPods, iPads, smartphones, digital cameras, computers and laptops. These are now part of daily life, with blurring lines of functionality between each device. Students have rich online worlds and lives that they are creating for themselves (Prensky, 2012). They do things differently and employ a range of technological tools to assist and support them.

The focus of this article is to consider ways to incorporate application software (apps) with digital technology to support the teaching of the *Australian Curriculum: Mathematics* to primary-aged students in meaningful and engaging ways that captures their attention, and involves them equally in the learning and teaching process.

Incorporating apps with technology devices into the learning process

In relation to the *Australian Curriculum: Mathematics* (F–6), the use of apps with technology devices makes learning engaging for students, and supports the knowledge, skills and understanding objectives of Early Stage 1 to Stage 2, with the possibility for extension work or development of activities applicable for use in Stage 3 classes. The seven general capabilities of literacy, numeracy, information and communication technology capability, critical and creative thinking, personal and social capability, and both ethical and intercultural understanding can also be incorporated into the design of tasks and activities developed.

The incorporation of technology supports the primary school curriculum by:

- encouraging children to have a positive attitude to a subject;
- developing confidence within children through applying skills in practical, real-life situations;
- facilitating meaningful talk and discussion as children collaboratively work on tasks and activities;

- consolidating learning through engaging with ideas and concepts in a wide variety of concepts covered in class but, also, to introduce new ideas in an exciting and interesting manner;
- providing opportunities for revision and reinforcement of concepts covered; and
- integrating with other curriculum areas to show links between and applications of mathematical concepts.

Learning with Skitch

Initially a web tool on its own but later purchased by *Evernote*, *Skitch* is one example of an app that can be used as part of the learning and teaching process by students and teachers. A free mark-up tool, *Skitch* is available to download for Macintosh, Windows, iOS (iPhone/iPad) and Android devices. This app allows for easier use and explanation of images.

Users can visually share their thoughts with others by allowing them to capture, annotate or adapt, and then mark up the original picture or screen shot with text, arrows, highlights and different shapes (Figure 1). More simply, *Skitch* can be used to snap it, mark it up with simple tools, and send it on in an instant.

The app can be used in a variety of alternative ways to record information. Created images can be shared, pasted into application programs, or used in online environments by students or teachers as part of the learning process.

Ideas for using Skitch in the mathematics classroom

This section provides some suggested activities in which *Skitch* can be used with the F–6 syllabus for the *Australian Curriculum: Mathematics* involving the content strands Number and Algebra (ACMNA), and Measurement and Geometry (ACMMG). Components of Working Mathematically (WM) are integrated into each of these two strands, and the five interrelated components: communicating, problem solving, reasoning, understanding, fluency are addressed through the structure of the activity developed and conducted by teachers. Working Mathematically is seen to be an essential part of the learning process and provides students "with the opportunity to engage in genuine mathematical activity and to develop the skills to become flexible and creative users of mathematics" (Board of Studies NSW, 2012, p. 33).

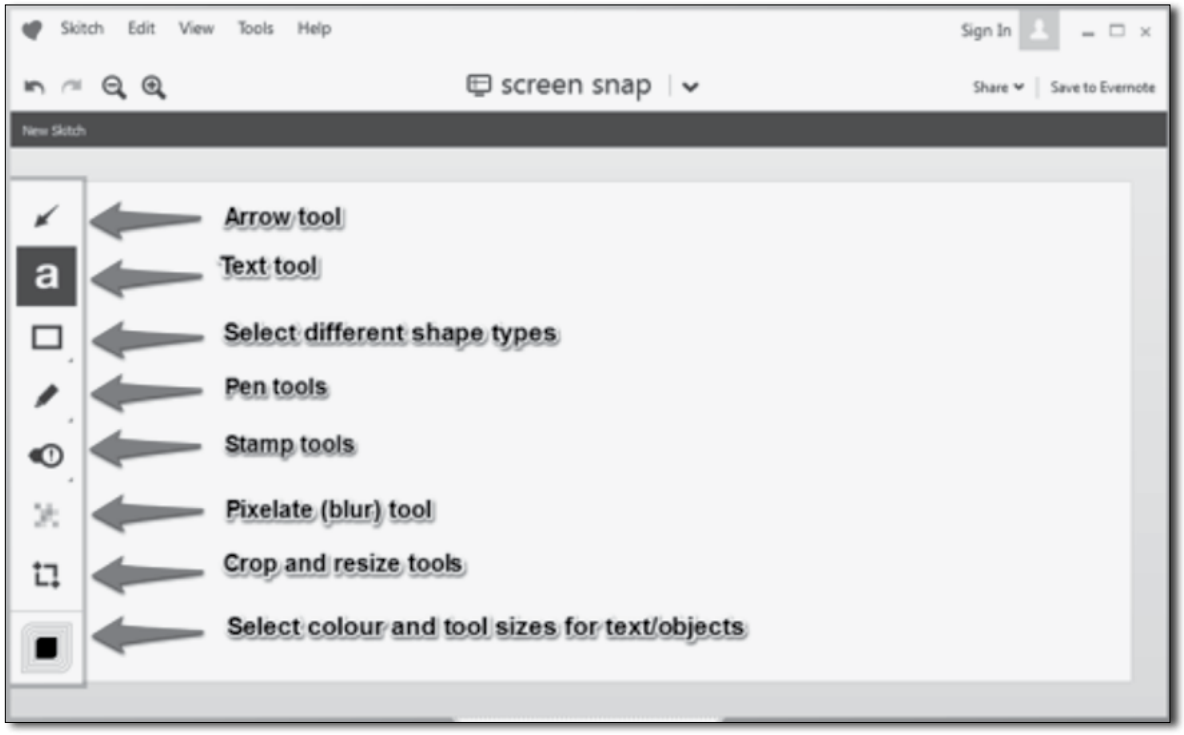

Figure 1. Skitch tools (Windows version).

Activity 1: Finding shapes around us

Students walking around the city, home or school can note geometrical shapes in the landscape around them. Figure 2 shows a number of different shapes identified on a walking path. A digital camera has been used to 'snap' a section of the pathway, and then *Skitch* has been used to annotate and highlight the shapes in the photograph taken.

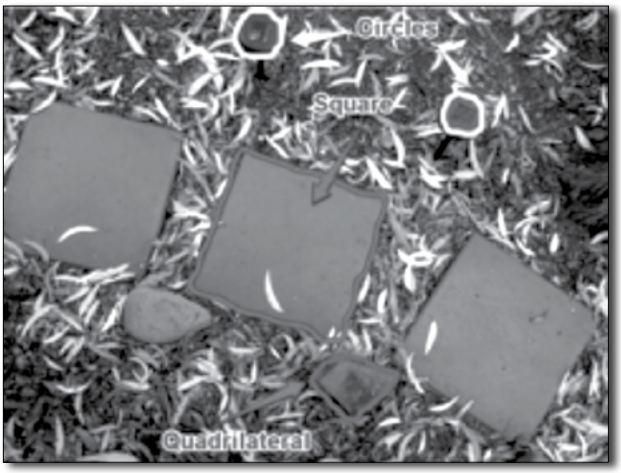

Figure 2. Finding shapes on a walking path.

Two-dimensional shapes can be identified and, for older students, discussions can range to three-dimensional shapes and their features. Student work can be extended to include the drawing and descriptions of shapes, and followed up by discussions about their properties.

Activity 2: Maths trails

Maths trails are popular around the globe and enable students of all ages to explore their community, or parts of their school buildings or grounds. Real-life examples of relevant mathematical concepts are found, and students then have the opportunity to identify, characterise, photograph, discuss, and post or report further to their peers and teacher. *Skitch* can be used to explain features of the route. Trails (Figure 3) can be designed for students to follow, and using a technology device like an iPad or digital camera, snap things along the marked route. If using an iPad, smartphone or iPod, questions can be pre-loaded onto the device in advance by the teacher and completed by students as they explore the set trail. Questions to use as starting points may include:

- Look around you. What can you see?
- How many?
- How far, or near?
- Estimate the size, height, length, weight of…?
- What is the name of…?
- Why do you think the path does not follow a straight line?

Figure 4. Setting up a maths trail route.

Activity 3: Angles

Have you ever noticed the types of angles that can be found around you? Buildings, clocks, nature, and amusement parks all have examples of angles in their design or structure. From a simple photograph, *Skitch* can be used to trace and highlight the angles in the pictures (Figure 4). Annotated images can then be shared for discussion and further activities. From an initial identification activity, younger students can describe, compare and classify angles. For older students, and as an extension exercise, angles could be measured on the image and then reproduced using geometrical equipment.

Figure 4. Finding angles.

Activity 4: Position

Students can take photographs of simple maps and grids to demonstrate an understanding of position. They can describe, provide simple directions, and represent the position of objects in everyday situations. For older students, images 'snapped' can be used to mark up routes and show compass directions (Figure 5). Images can be used in class discussions, and extend student thinking to topics including distance and time in practical situations, like travel. Information could then be interpreted and represented in various graphic illustrations. Writing a story about the journey represented would be a useful task, and blends numeracy and literacy skills together. Students could share their stories, and present them visually.

Figure 5. Position.

Activity 5: Fractions

Skitch can be used to illustrate fractions by taking students on a guided walking tour. Students can make or find various fractions, then use an iPad with the app to "snap, mark up, and send" their images to a shared account for later viewing and discussion with the class. Alternatively, a digital camera could be used to capture the image which can then be downloaded for use in a computer environment. Figure 6 shows an image of floor tiles that have been marked up. Student discussions can focus on the number of floor tiles, how many are shaded, the fraction of tiles shaded or unshaded. An extension idea for this activity would be to convert the results to decimals and percentages. Area and cost could also be discussed, and if the tiles were different colours or patterns, probability questions could be posed.

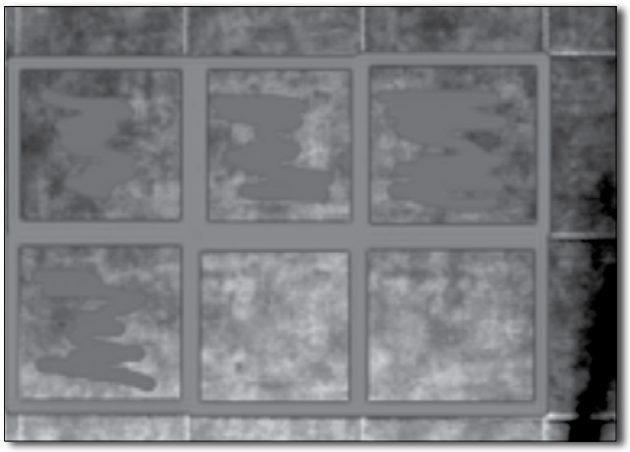

Figure 6. Fractions with floor tiles.

For younger students, a fraction activity may be as simple as taking pictures of counters or dice (Figure 7) and writing number sentences to interpret the image and to develop understanding.

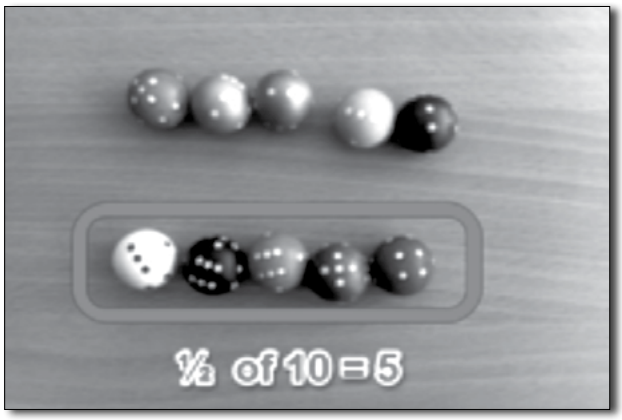

Figure 7. Making number sentences.

Older students could use images taken to write their own fraction problems with answers, and to then share these in a peer learning process. Creating fraction stories would be another way of using the images, and checking for student understanding.

Conclusion

Using *Skitch* to blend technology with the exploration of concepts involving working mathematically, making connections, communicating, and applying skills in a mathematical context can be achieved through practical and engaging activities. Depending on the concepts being covered, activities can be developed to use with students from early Stage 1, and modified for use up to Stage 3. Students are challenged to observe,

reflect, and think creatively and critically about their environment, as well as to consider the mathematical ideas that link concepts together. Individual and collaborative discussions, together with the sharing of images can occur seamlessly, and allow students to broaden their awareness of the many instances when mathematics can be observed and investigated in the world in which they live.

References

Board of Studies, New South Wales [BOS NSW]. (2012). *NSW Syllabus for the Australian Curriculum: Mathematics K–10, Volume 1. Mathematics K–6.* New South Wales, Sydney: Board of Studies.

Jonassen, D., Howland, J., Marra, R. M. & Crismond, D. (2008). *Meaningful learning with technology* (3rd ed.). Upper Saddle River, NJ: Pearson Education.

Prensky, M. (2013). *How Should Technology Be Used? Perfect Quotes from Marc Prensky* [blog post quoting tweets]. Retrieved 14 January 2013 from http://powertolearn.typepad.com/teacher_tech_blog/2013/01/how-should-technology-be-used-perfect-quotes-from-marc-prensky.html

Prensky, M. (2012). *From digital natives to digital wisdom: Hopeful essays for 21st century learning.* Thousand Oaks, California: Corwin.